

AVIATION WEEK

NOV. 8, 1948

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AVIATION WEEK, November 5, 1950



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THE AVIATION WEEK

Battle of the Budget

Although the ballots have barely been counted and the gavel clicking the 81st Congress to order will not fall for another two months, the airman and the admiral are maneuvering for another bitter battle over the future of American air power. For all preliminary estimates the 1949 campaign should be a bitter and more decisive encounter than the free of last spring. Stenbacking is already back on the public rostrum with a host of newly promoted air generals extolling the virtues of the independent Air Force as an free battlefield early in the fall and on Navy Day last month 150 admirals solemnly predicting 150 reasons why bigger and better carriers are needed.

The Struggle

But the real blow are not being traded as the speakers platforms however strenuous may grow the debate. It is in the budget hearings of the National Military Establishment now in progress that the head to head struggle is waged.

It is the emergence of the National Military Establishment next budget for fiscal 1950 that will show the final stage which the Congressional battle will be fought. Preparation of the budget, normally due in mid-September, has been twice postponed and indications now are that it will be a tight squeeze to get it into the President's January budget message to Congress. The Budget Committee already set a \$15,000,000,000 ceiling as the national defense budget. It is obvious that all three services cannot be satisfied under such a ceiling. Whoever is squeezed the hardest will put up the strongest appeal to Congress.

The Air Force has already filed its opening blast in the Congressional battle with a declaration by Senator H. Styles Bridges (R., N. H.) in the *Aircraft Industries Association* publication *Planes* that the 70-Comp Air Force bill will get top priority from the next session of Congress. Bridges is a powerful voice on Capitol Hill as chairman of the Appropriations committee and a member of the Armed Services committee.

Navy Need

In the same publication Rep. Chester Mowbray (R., N. H.), a lesser Congressional authority, chief of the

Navy's need for \$7,540 new planes in the next year.

With Democratic control of the Congress, President Truman will probably have more success in enforcing his budget object than he did during the last session of the 80th Congress. An end run around the White House to Capitol Hill such as was staged by the Air Force last spring will be difficult if not impossible to stage during the 81st Congress.

It now appears that whatever tactics the Navy employs in its fight on Capitol Hill, it will be essentially a rear guard action. The Air Force won the resulting victory during the last Congress and will still be on the offensive pushing the second step in its five-year 70-Comp program with the momentum it gained from almost unanimous support last spring. It will have the added advantage now of having for the first time in history a weapon technically capable of negating the kind of strategic air warfare that armies have been talking about for 30 years. The proving out of the Convair B-36 has materially strengthened the Air Force hand at least temporarily. For Air Force generals now can tell Congress with a straight face that they have the means to deliver atomic bombs anywhere within the significant northern hemisphere without the use of advanced bases on foreign soil.

Can't Match

Counting all of the possible tactical shortcomings of the B-36 in combat, the Navy has nothing that can match this weapon at the present time. Its supercarrier is at least five years away. It does not yet have a plane properly equipped to carry the atomic bomb and no practical carrier based atomic bomber that could yet to produce the Navy's theories on unbased strategic air power.

Perhaps the best case the Navy can make for its immediate role in strategic air war is the proposal by Capt. Schellhaas reported elsewhere in this magazine for a combination of submarine and long-hauler based on a Navy type bomber as its long hauler and end from a potential land target. The terror inter-based aviation of the Navy could be useful only in support of amphibious operations and in sweeping the seas of enemy warships and submarines. At the moment that need seems less urgent to legislators and public alike than the requirement for the means of delivering atomic bombs swiftly and surely deep into the heart of a potential foe. Perhaps this will be the time on which the coming battle of the budget will be fought.



The "Unbrako" Intersect Wrenching Bolt (A), and the 100" Flank Head Bolt (B), are practically "events" in the Aviation Field... they so exactly meet the requirements of precision, inside fatigue and other stringent requisites of Aviation Engineering. And the other popularly acclaimed "Unbrako" Products, pictured to the right, have proved themselves absolutely dependable.

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"WON'T SHAKE LOOSE" The Unbrako Cap Point of 100" Flank Head Bolt (B) is so exactly meets the requirements of precision, inside fatigue and other stringent requisites of Aviation Engineering. And the other popularly acclaimed "Unbrako" Products, pictured to the right, have proved themselves absolutely dependable.

"UNBRAKO" SOCKET SET SCREW WITH KNURLED CAP POINT



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"UNBRAKO" KNURLED SOCKET HEAD CAP SCREW



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UNBRAKO KEY KEY The Unbrako Key Key is so exactly meets the requirements of precision, inside fatigue and other stringent requisites of Aviation Engineering. And the other popularly acclaimed "Unbrako" Products, pictured to the right, have proved themselves absolutely dependable.

NEWS DIGEST

DOMESTIC

Flight Safety Foundation transferred its annual accident investigation course (Aviation Week, Nov. 1), opening today, from Woods Hole, Mass., to Mitchell Air Force Base, Hampton, N. Y., to better disseminate its course.

Air Line Dispatchers Assn. elected Herman C. Merrill president. He has been a dispatcher for Island Airlines and Western Airlines. He succeeds George E. Deming as president.

Personal aircraft shipments for September reported to Aircraft Industry Assn., 4/3 to 1/75, from 680 to 950. Value totaled \$1,400,000, against \$2,704,000 in August. Shipments included 599 biplanes, 216 bombers.

American Airlines' new department of maintenance at LaGuardia Field, members of Local 101 of Transport Workers Union, ended a two-day strike which began when the union members protested use of other employees in taking necessary about 150 employees involved. AA's operations were not affected.

FINANCIAL

Boeing Aircraft Co. reports net income after taxes of \$1,590,735 for nine months ended Aug. 31, on sales of \$10,251,121. For the same months ended Aug. 31, 1947, company had net income of \$1,170,007. In 1948, backlog was \$201,281,000, 95 percent of which was military. Backlog also included about \$70 million in military contracts not yet signed.

McDonnell Aircraft Corp. reports net income after taxes of \$1,671,000 for nine months ended Aug. 31, on sales of \$20,738,996. For previous year, net was \$1,440,870. June 10 backlog totaled \$90,672,075, 95 percent in Navy production contracts, 2 percent Navy experimental and 3 percent C-54 experimental work. Backlog is highest in company history.

Republic Aviation Co. reports net income after taxes of \$1,748,579 for nine months ended Sept. 30 on sales of \$19,171,579. Earnings available were \$1,047,000. Backlog is about \$70 million, mostly for F-84 Thunderjet fighters.

Canair Aircraft Co. declared dividend of 25 cents per share on 700,000 shares of outstanding stock, payable Dec. 6. In fiscal year ended Sept. 30, company's sales increased about 40 percent to approximately \$14,250,000.

Kearney Co. announced dividend of 50 cents a share payable Jan. 2, 1949, to holders of record Dec. 17, on first step in new policy of paying total of \$2 in dividends annually.

INDUSTRY OBSERVER

►Fairchild Engine and Airplane Co. has completed first two prototypes of the C-119, an improved version of the P-51 and the meeting of the C-128, another version of the P-51 with a detachable landing gear. Production line is being set up to handle the initial 30 production models of the C-119 while test parts are being fabricated for the C-128 prototype.

►Prototype of the Armstrong-Johnson de Havilland Duster has completed its company tests and is now with the Royal Australian Air Force for service tests. Second experimental model of this transport aircraft will add some tests to those already in the only major change over the first model.

►A prototype jet Goodrich motor is being designed by Mooney Delmore. The motor will be built in Texas. Delmore claims the design will get 230 mph out of the 65 hp. Continental engine required for the motor. The Delmore plane is 17 ft. 7 inches long with a wingspan of 16 ft. 4 inches.

►Second Martin XB-45, six-engine jet bomber has been flown to Naval Air Station at Patuxent, Md. for preliminary flight tests before delivery to Wright Patterson Air Base. First XB-45 which made its first flight more than a year ago is still undergoing flight tests at Wright Patterson.

►Boeing Aircraft Co. will expand its activities at its engine, government-owned, Renton, Wash. plant. Boeing is now using about one-third of the Renton plant for storage but will eventually produce experimental models of the XB-52 and XB-55, giant turbojet bombers there. Production of the B-54, an improved version of the B-50 powered by Pratt & Whitney VDF engines is also scheduled for Renton.

►Certification of the Consolidation for a new gross takeoff weight of 95,000 lb., adding nearly 5000 lb. to weight limit, will be sought by Lockheed in flight tests to start immediately. Moderate strengthening of several structural points will be required for the new load condition, but will increase empty weight by not more than 400 lb. Lockheed plans to make modification kit available to re-type Consolidation aircraft for modification of their equipment to new weight allowances after certification is granted.

►Boeing Aircraft Co. is now at work on a \$1,525,000 subcontract from Boeing for the construction of Stratosphere engine center. The 14 ft. 10 in. sections comprise the test facilities of both the commercial Stratosphere and the Air Force C-57A engine center.

►Industry observers wonder how long Air Force and Navy experimental test pilots are going to have to wear their crash helmets out of their own pocket because Wright Field and DuPont procurement officials refuse to provide them with the new types of protective helmets used by most normal company test pilots.

►Trans-Canada Air Lines is switching from four to three-bladed propellers on its North Star (DC-64-3) transport in an effort to eliminate passenger complaints of excessive noise. Exhaust stacks are also being redesigned to channel their noise away from the cabin.

►The United States engine transport, Beech Starline 930, has completed its initial test flight at Miles. This transport is powered by British Bristol Centaurus engines and is on order for Indian Airlines and the Argentine Air Force.

►Aero's Skunkworks bomber is nearing completion and is expected to fly early next year. The long-range reconnaissance bomber, originally designed for Coastal Command, is larger than the Lincoln and is powered by four Rolls-Royce Griffon engine-propeller engines.

AVIATION WEEK

Nov. 8, 1960



Plane-Sub Team Devised for Navy

By Robert Hitt

A new type of Naval air strategy was proposed last week for the long range delivery of atomic bombs on enemy targets. It would take the new type flying boats now under development by

the Navy with submarines in a tactic that could, according to its proponent, deliver atomic bombs economically and effectively.

The operation is predicated on two developments already well advanced for the development of a fast long

range flying boat with performance equal to that of the best land-based bombers now in prospect and second, the provision of submarines equipped to function as flying boat tenders.

■ **Flying Boat Pioneer**—Schlitzner has been a Naval aviator since 1915. He was a test pilot at the Naval Aircraft Factory where he was associated with the testing of the Glenn L. Martin Co.

► **Use U. S. Bom—**Utilizing this equipment a flying boat could take off from any point in the United States, refuel from one or more submarines at sea and take aboard its atomic bomb from the fast submarine, constantly, under its attack on any land target within 3000 miles of its last refueling point, and attack its another submarine for refueling in the way home. Advocates of this tactic point out that it allows the twin advantages of surprise and economy.

Cost of a speedy flying boat and its submarine tender would be only a fraction of the price of a super bomber and its train at a land-based very heavy bomber group and its headquarters and defense facilities. By using mobile, disappearing submarine bases the possibilities of surprise for the type of attack are enhanced.

► **Use Like Warplane**—During the last war the Japanese used this type of attack to bomb Hawaii three months after their initial attack on Pearl Harbor. This little publicized attack was made by two Japanese landy type flying boats based on Wake Island. On the night of March 4-5, 1942, they were refueled off French Frigate Shoals, west of Hawaii, by three specially equipped tender submarines of the Japanese sixth fleet. They flew to Hawaii where one dropped bombs near a high school in Honolulu. The other several off before it crashed. Oahu and did not launch. Neither Navy nor Air Force planes were able to make an interception.

The Navy has already announced it has converted one of its submarines to an experimental tender submarine capable of housing and servicing aircraft were developed before the war by the French and Japanese. Conversion of a modern submarine to a flying boat tender would be relatively simple according to Naval experts.

► **Schlitzner is Proponent**—The use of flying boats and submarines for long range, surprise atomic bomb attacks was proposed by Capt. C. H. (Duke) Schlitzner, USNR, (ret.) a pioneer in the development of long range flying boats.

It has been discussed unofficially with a number of high ranking Naval air officials none of whom have offered any unambiguous inclusion of the project in its execution. Navy officials have any official comment on the project. It is believed that official Navy endorsement of the project might be combined as a violation of the Newport agreement to which the Joint Chiefs of Staff gave the Air Force primary responsibility for atomic bombing.

► **Flying Boat Pioneer**—Schlitzner has been a Naval aviator since 1915. He was a test pilot at the Naval Aircraft Factory where he was associated with the testing of the Glenn L. Martin Co. in the development of large, high speed flying boats.

► **Design Features**—The flying boat submarine combination will require a flying boat at the design type. Capable of carrying the high level bomb into enemy territory on the Convair XP5V-1 turboprop power for cruising and turboprop power for maximum speed in the target area, a gas engine to keep propellers clear of the water, and a variable wing design. This flying boat would weigh about 140,000 lb., have a range of more than 40,000 miles and be capable of 400 mph at 35,000 ft.

All of the design features required for a flying boat with this performance

Latest Orders Announced by AF

U. S. Air Force last week confirmed Avianco's Wright's exclusive story on Sept. 27 that the new procurement program for fiscal 1949 would go to Northrop, Boeing, Convair, and Sikorsky divisions of United Aircraft Corp. USAF also confirmed Avianco's Wright's exclusive story on October 4 that Convair had won the Air Force twin engine transport competition with a modified version of its commercial transport Convair-Liner.

Latest orders for fiscal 1949 as announced by the AF are:

- **Boeing Airplane Co.**—10 B-47 jet bombers.
- **Northrop Aircraft Inc.**—30 B-2 (C-121) transport transports.
- **Convair**—17 T-39 twin engine transport and bomber trainers.
- **Convair Aircraft Co.**—12 Model 195 four place executive transports.
- **Sikorsky Division of UAC**—35 HO4 four place rescue helicopter.
- **Walter Type Defense**—An order for 10 Koffert NH-10 seaplane transport helicopters will also be placed but USAF has not yet determined who will produce the Koffert-developed model.
- **USAF** will spend \$56,000,000 of its fiscal 1949 procurement funds to spend

approximately \$16,000,000 in re-evaluated for possible results and the other \$40,000,000 in re-evaluated for layout of a new type machine lighter after the collapse of Convair Wright's order for production of 50 F-99s.

► **Type Changes**—Changes in plane types ordered since the original procurement schedule was planned have cut the total number to be bought from 1727 to 1599. Shifts from low and medium planes and helicopters to expensive jet bombers and twin engine bombers, and the new order of 184 planes from the original procurement program approved by the last session of the 85th Congress. Purchase of 10 Boeing B-47 jet bombers at approximately \$4,000,000 apiece and a Convair bomber Convair-Liners to be used as pilot trainers to an extensively modified version suitable for bombardier and navigator training were the major changes in the last procurement program responsible for the 185 plane reduction.

Meanwhile the Navy put a request to spend an additional \$54,900,000 for new aircraft plant facilities and modified facilities. Convair had spent \$57,000,000 will go for new plants.

renewed place in 1924. This airplane operated from a submarine at sea and was launched in a submersible tank when the submarine submerged. Schlitzner resigned from the Navy in 1933 to be owner associated with General Motors Corp., in its Division Co. of America, a subsidiary of the General flying boat manufacturers.

He joined The American Aviator in 1935 and directed service operations for commercial flying boat service across the Atlantic and Pacific. During the war he organized the Naval Air Transport Service and was Navy project officer on development of the giant Martin Mars flying boats. After the war he became associated with the Glenn L. Martin Co. in the development of large, high speed flying boats.

► **Design Features**—The flying boat submarine combination will require a flying boat at the design type. Capable of carrying the high level bomb into enemy territory on the Convair XP5V-1 turboprop power for cruising and turboprop power for maximum speed in the target area, a gas engine to keep propellers clear of the water, and a variable wing design. This flying boat would weigh about 140,000 lb., have a range of more than 40,000 miles and be capable of 400 mph at 35,000 ft.

All of the design features required for a flying boat with this performance

have been proved feasible by research of the National Advisory Committee for Aeronautics and many of them are already incorporated in experimental flying boats now nearing completion.

► **Trade Requirements**—The submarine tender would take the flying boat into the water, launch it, and take the plane into position for refueling and taking aboard atomic bombs by blowing its atom bomb tanks and bringing the atom to the surface. Schlitzner pointed out that extensive rough water handling characteristics would not be required for these flying boat bombers since the refueling operation could be conducted in relatively shallow waters, the few of which are other potential weaknesses.

If successful operations of this type are required it would be possible to create the tactic, Schlitzner believes, through the use of a flying boat tender of the Mark type carrying a long range land-based bomber such as the Lockheed P3V type. This plane already holds the world long distance record of 11,219 miles nonstop from Australia to Columbia, Ohio. The flying boat tender would take the plane from a submarine tender and refuel the bomber in the air for its final run to the target. This definitely would not be as simple or effective as the flying boat sub team that would be possible in the future.



F-80 Flies on Ramjet Power Alone

As part of engine development program, more than 100 flights made with units mounted at wing tips.

A pilot's aircraft has been flown solely on ramjet power. The first was accomplished by the first test Nov. 21, 1947 by Tony Leary, Lockheed chief engineering test pilot, in a Lockheed F-80 jet fighter with ramjet units mounted at the wingtips.

Subsequent ramjet flights have been made by H. R. "Bud" Sullivan, Lockheed test pilot, with E. A. Jones, flight test engineer, as observer. The flights have been made from Lockheed's flight base at Van Nuys, Calif., and at Muroc Air Force Base, Calif.

Marquardt Engineering-Tac, aircraft engines were designed and built by Marquardt Aircraft Co., Vincent, Calif., under an Air Force development contract. Two units have been used, one 16 in. diameter and 1 ft. long and an other 18 in. diameter and 16 1/2 ft. long.

Since the ramjet engine used attain an increasing output of 250-300 mph in order to increase combustion, the F-80 is taken off with its Allison J-35 turbojet engine and flies to a speed of about 400 mph and an altitude of 20,000 ft. before the ramjets are ignited. After the ramjet engines commence firing the turbojet engine is shuttled and the aircraft flies on ramjet power alone.

Research Project—The research project which has been made new for more than a year at Lockheed, is a research program as the development of the new jet engines and is not designed to increase the performance of the F-80, which is used merely as a high speed test vehicle. More than 100 flights have been made during the program.

The F-80 is instrumental to record thrust, drag and fuel consumption of the ramjet engines. Recording is made by means of a camera mounted below a

special instrument panel, providing a continuous photographic record of instrument readings which include air speed, air temperature, fuel temperature and altitude data.

Plane Test—Initial firing of the ramjet produces a thrust of 10-40 ft. long from the aft end of the nose. As firing progresses this thrust is reduced to 15-70 ft. As soon as the proper relationship between airspeed and fuel speed is obtained, the three thrust droppers, the ramjets are extremely noisy, however, and the engine can be heard far below. This is one of the technical objections to their use.

Major advantages of the ramjet engine is its ability to produce increasing power as increasing speed and it has been said the aircraft powered by high speed ramjet. Its present disadvantage is its high fuel consumption rate, which is second only to the rocket as the propellant source. However, at high speed, ramjet is comparable to that of present reciprocating engines.

Air Force Confirms YB-49 Record

The Northrop YB-49 jet announced about 9 hours in tests all jet aircraft thrust and endurance records. The four-engine bomber covered 345 miles over a duration course remaining in the air for 9 hours 30 min. The flight took off from and landed at Muroc Air Force Base, Calif.

The 100-ton craft carried a crew of five in total of 13,000 gal of fuel and 10,000 lb of ammunition. At the high altitude position of the

flight was made at an average ground speed of 383 mph, the flight was an endurance test and no attempt was made to achieve high speed. The Air Force announcement confirmed an exclusive Aviation Week story of June 26, 1949.

Used Jet Engines—All eight of the Allison J-35 turbojet engines were used throughout the flight with the exception of one engine that developed a hot bearing after 54 min. running and had to be shut down. Power was increased as the remaining engines to maintain the original cruising speed. There was no increase in fuel consumption noted by the change in power.

The cruise portion of the flight lasted 9 hr. 3 min. and was made at 15,000 ft., 21 min. being consumed in climb, climb and descent. Long vapor trails extended across the day sky as much as 100 miles behind the bomber.

Test Crew—The five-man crew consisted of Air Force Capt. Jay Wattle, Mr. Stender and Fred Berthel, Northrop test pilots. O. H. Douglas and Dave Smith, Northrop flight engineers. The crew members were seated at the controls during the flight.

Indication of the range potential of the low drag Flying Wing bomber is the fact that the YB-49 took off at a gross weight considerably less than its maximum 215,000 lb. Although about 13,000 gal of jet fuel were carried, this capacity can be increased to more than 35,000 gal by the use of bomb bay fuel tanks, increasing this capacity to 45,000 gal. Since this fuel can be used more than 11 hr. and more will cost 9000 miles.

Production Model—Allison's turbo-propeller-driven YB-35 Flying Wing version is shown as a heavy bomber because of its 10,000 lb. fuel load and 10,000 lb. payload, the design stage of the YB-49 results in as heavy design only a medium bomber by the Air Force. Air Force has ordered 36 YB-49s, the production YB-49 bomber developed a "high performance version" carrying a large amount of combat equipment.

British Bombers—Present, Future

Piston engine Avro Lincoln to remain standard bomber of RAF until advance jet projects become reality.

Recent work was conducted over England and the future plans of the RAF for the development of the Avro Lincoln bomber. The Lincoln bomber is the only British bomber which has been actually in production of the de Havilland Vampire series of night-fighters. The Lincoln bomber is the only British bomber which has been actually in production of the de Havilland Vampire series of night-fighters. The Lincoln bomber is the only British bomber which has been actually in production of the de Havilland Vampire series of night-fighters.

Class of World War II—The RAF has decided to keep the Lincoln bomber in production until a new bomber project is completed. The Lincoln bomber is the only British bomber which has been actually in production of the de Havilland Vampire series of night-fighters. The Lincoln bomber is the only British bomber which has been actually in production of the de Havilland Vampire series of night-fighters.

Advanced Types—According to the British government, the Lincoln bomber is the only British bomber which has been actually in production of the de Havilland Vampire series of night-fighters. The Lincoln bomber is the only British bomber which has been actually in production of the de Havilland Vampire series of night-fighters. The Lincoln bomber is the only British bomber which has been actually in production of the de Havilland Vampire series of night-fighters.

RAF Standard Bomber—The Avro Lincoln B.Mk.2 is the standard bomber of the RAF. It is a piston engine bomber which is the only British bomber which has been actually in production of the de Havilland Vampire series of night-fighters. The Lincoln bomber is the only British bomber which has been actually in production of the de Havilland Vampire series of night-fighters.

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New Jet Prototype—Older design is being replaced by a new jet prototype. The Lincoln bomber is the only British bomber which has been actually in production of the de Havilland Vampire series of night-fighters. The Lincoln bomber is the only British bomber which has been actually in production of the de Havilland Vampire series of night-fighters.

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Wing. British are not likely to have jet bombers in service before 1952.

American and Delta Ask Equipment Interchange

American and Delta Air Lines have asked Civil Aeronautics Board approval of an equipment interchange agreement which would establish the first through air plane transatlantic service between the Southeast and the West Coast.

The carrier had applied previously to the Board for new aircraft transatlantic service but was told that it was not possible to provide better service without a change in schedule and possibly a decrease in capacity. American and Delta recently indicated a willingness to decrease their single plane service between the Southeast and the West Coast.

Under the American-Delta pact, through DC-6 service would be provided from Miami, Jacksonville, Atlanta, Birmingham and New Orleans to Los Angeles via Dallas, El Paso, Tucson and Phoenix. Other cities may be added. Equipment interchange pact would be Delta-Pf. Worth, and service would start as soon as CAB approval is received.

Plans of both carriers would proceed over the other company's routes as each decision. Delta and TWA are presently operating the only domestic equipment interchange between Detroit and Los Angeles via Dallas, El Paso, Tucson and Phoenix. Delta president, C. E. Wagoner, Delta president, reports that after five months of operation the TWA agreement is working smoothly to the public advantage.



PHANTOM BULLY TANK

First flight photograph of special, four-point personnel both test and for use since a year in the McDonnell J2D-1 Phantom Navy and Marine Corps flight instructor was put into production by Navy. The tank costs 250 gal and only 400

Phantom supply tanks are not standard equipment for tanks operation due to high cost level of center landing gear and use for one-quarter load land flight. Phantom has approach speed 100 mph. The tank costs 250 gal and only 400



The Avro Canada XC-100

Details on Canada's Jet Fighter

Canada is producing its first jet fighter.

First details reveal that the Avro Canada XC-100 is a tandem-seat, all-weather fighter powered by two 6780-hp turbo thrust Rolls-Royce Avon turbofan engines, capable of a speed of 675 mph. The XC-100 is built to a Royal Canadian Air Force specification.

► **Designer**—Prototype XC-100 now nearing completion at the Milton (Toronto) plant is presently owned by J. C. M. Frost, British designer, who worked with Chief Designer Ian MacLeod of the de Havilland DH-108 supersonic craft that broke the sound barrier.

► **Use**—The XC-100 powers the success that Avro Canada expects, it will be offered to both British and American governments.

► **Performance**—An all-weather low-level monoplane at between 25,000-27,000 ft (depending on weight), the XC-100 requires a five-degree minimum altitude which allows also temperature at high speeds, to 80 F.

► **Non-potential carrier**—Avro Canada might incorporate radar, fire control, and a radar-guided missile.

► **Crew**—The jet is powered by an auxiliary jet turbofan windmill and a one-piece engine.

► **Fuel**—A carrier is being fitted behind the jet's own engine.

► **Wing**—The high conventional self-aligning and straightforward jet and radar are employed.

► **Wing**—The wing is a dihedral but incorporates the German "drop-shoulder" low-order flap.

► **Landing Gear**—A droopy landing spring arms are employed, the main gear using steel diameter tires which are not used in the air.

► **Engine**—The Avro Canada XC-100 is a tandem-seat, all-weather fighter powered by two 6780-hp turbo thrust Rolls-Royce Avon turbofan engines, capable of a speed of 675 mph. The XC-100 is built to a Royal Canadian Air Force specification.

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Plane Development Clash Exported in New Congress

As transport and manufacturing interests appear headed for a clash over commercial plane development policy in the new Congress.

An Transport Association's executive vice president, Robert Rasmussen, is already contacted ATA's industry of the Revenue-Herndon bill authorizing commercial development of new cargo and transport types. Opposition of aircraft manufacturers was largely responsible for blocking enactment of the measure this year, and functions as chances in the next Congress. Manufacturers, who originally pushed the proposal, now look with increasing dismay on the government's direction of commercial plane development and manufacturing which would follow from the measure. Two firms—Consolidated Value Corp. and Glenside L. Martin Co.—are supporters of the bill, which would authorize the post-war for advanced government-funded jets in line of the first jet in the air.

► **Seek Compromise**—Industry leaders, however, are already in a state of mind to attempt to arrive at a compromise proposal acceptable to its members and other aviation interests at its board of government meeting in December. Rasmussen is now strong in manufacturing circles that provide firms, financially buttressed by this year's unusual military business, will be able to handle commercial development.

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Throughout work areas where New Departure micro-instrument ball bearings are produced, you'll see operators clothed in smooth and easy to clean, specially selected fabric. This synthetic textile is important because it greatly reduces the possibility of lint or other particles getting into and in way of affecting the functioning of these precise, highly sensitive instrument bearings. Such attention to detail is characteristic of the way things are done at New Departure.



Specially selected synthetic fabric under the microscope. Note the smooth, non-linty keeping finish of the material and absence of ball or bearing films.



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ENGINEERING



Design Analysis

Northrop C-125 Based on Pioneer

In contrast to usual practice, this multi-purpose military transport originally was conceived to meet commercial cargo plane needs.

By Robert McLaren

The Pioneer transport has been designed, redesigned by Northrop Aircraft Inc., Hawthorne, Calif., in the evolution of its Rader military version.

Larger, heavier, and with greatly improved performance, the new transport version features special facilities for the handling of many types of military loads from a variety of loading systems.

The Rader will be virtually a new airplane and presents only the complexity and necessity of its *paraphrase* together with its extraordinary lift-off and landing characteristics.

► **Commercial Background**—Northrop began design studies of a postwar civil aircraft during the closing days of World War II when its wartime commitment faced the future with any degree of certainty. Without exception, all of the major military aircraft producers of World War II set their postwar sights on commercial aircraft designs following the first drastic cutbacks in 1944 and even more severe reductions in the Spring of 1945.

Despite Northrop's switch to a commercial aircraft as a postwar project, the

existing design has wound up as a military plane.

The original Pioneer was laid down as a "bush fighter" with specifications selected on the basis of requirements for operations from small, rugged areas in Central and South America.

From the start, short take-off and landing characteristics were stressed and Northrop engineers met with phenomenal success in this objective. After these characteristics, simplicity in design and construction, low production cost, simplicity of maintenance and reliability were demanded.

► **Hurdles Encountered**—Recall that these rigorous design specifications was not a merely airplane but one with exceptional flight performance, but it did present the serious obstacle, mentioned previously, to an adaptable design. But from the start the Pioneer program met with wholly unpredictable difficulties that presented even a substantial expenditure of the craft's costs.

The Wright R-1500 engines specified for the plane were not available at the time of its completion in Fall, 1945. This engine had originally been developed prior to the war but further

work was dropped in the face of demands for the R-2600 and R-1330 power plants.

The R-1500 was again made an active Wright project in 1945 to meet the demands for the Lockheed, Boeing and Northrop "tender" class aircraft that in design.

Initially, Northrop was forced to install three Pratt & Whitney R-1340 24113 engines with a takeoff power of 600 hp, and a rated power of 350 hp. This 25 percent reduction in design power available handicapped the performance of the Pioneer from the start but it was decided to go ahead with the flight test program in the interest of speeding up the project in such as possible.

► **Test Program**—First flight test was made from Northrop Field in December, 1945, with Max Stanley at the controls. The craft was airborne in 1000 ft., although rather full takeoff power was being delivered was used. The test program got under way immediately and continued throughout 1947.

During the fall of that year the new Wright engine became available and was installed. The additional power bene-



From the commercial Pioneer . . .



. . . Came this design—new military Raider.

out, the accuracy of the original specifications. Flight tests proved the new raider capable of lifting the Pioneer off its main gear at a weight of 23,000 lb., and Northrop was able to guarantee a takeoff distance of 700 ft. at a full (and maximum) gross weight of 23,500 lb.

► **Active Interest**—Original prospective customer for the Pioneer was Transports Aeronautiques Centrales Americaines (TACA), a Central American airline group operating in Colombia, El Salvador, Honduras, Mexico, Nicaragua, Panama and Venezuela. TACA placed an order for 40 Pioneer transports when Western Hemisphere Co. completed negotiations for purchase of a major holding in the enterprise.

But the Civil Aeronautics Board has not extended permission for entry of the surface carrier-controlled airline into the U. S. and the order was withdrawn. Throughout 1947, however, Northrop played hard to representatives of airlines in a variety of foreign countries, including Iran, Chile, Peru, Argentina and Mexico and the Pioneer was demonstrated extensively.

► **Enter Air Force**—Meanwhile, the U. S. Air Force had established a tactical need

for a light cargo transport suitable for use over a wide range of operating conditions, and had invited bids from interested manufacturers.

Northrop engineers submitted design proposals on the basis of a modified version of the Pioneer.

Following study of more than a dozen different designs, Air Force selected Northrop as the winning competitor in September, 1947.

Formal orders were not processed until March, 1948, when Northrop received a \$5,500,000 contract for the construction of 10 Model C-47B, Arctic cruise variants and 11 Model C-124B assault transport versions of the Raider.

Only a few days before announcement of the contract award, the prototype Pioneer was destroyed in a crash that took the life of Northrop test pilot L. A. Fennell, who shared with the craft after two other test crew members had parachuted to safety.

The accident occurred during flight tests of a new emergency design incorporating a dorsal fin and a spring tab system. The fin was caused away during a maximum rate load maneuver and control of the airplane was lost.

► **Wing Data-Sense**—The unique lift-off and landing performance of the Raider is the Northrop-developed retractable slotted-or lateral control spoiler—processed automatically as the wartime P-61 Black Widow night fighter.

Basic advantage of the spoiler is that it permits the use of almost all the wing trailing edge for flap area with only top "hook" ailerons required to produce adverse stick forces for pilot control.

This wing follows the general plan form of the P-61 with straight leading edge and swept-back trailing edge.

It is built in the major assemblies—control section, two outer panels and two tip sections.

Control section has a constant chord of 15 ft. and is continuous through the fuselage. It supports the two wing power plant assemblies, leading gear units, two flap assemblies, and two main and two auxiliary fuel cells.

Outer panels each contain two flap assemblies, two spoiler units, one aileron, and one main and one auxiliary fuel cell.

Flaps, electrically operated via torque tubes opened from a central gear box, are double-slotted type in which a small, high number segment is extended along the leading edge of the inner flap panel to positive action to high flap angles.

Ailerons and spoilers are continuously operated by cable control from the cockpit. The two spoiler units on each outer panel are automatically connected to the aileron cables through a quadrant assembly that provides differential movement. All control cables are carried directly forward and upward along the wing leading edge. Flange segments of the leading edge simplify inspection and maintenance.

To accommodate the increased gross weight of the replacement, the Raider wing has 2 ft. more span and an additional 31 sq. ft. of area at the wing tip section.

► **Wingspan**—The originally circular (10 ft. dia.) fuselage of the Pioneer has been completely redesigned into a more rectangular cross section in the Raider.

The new trailing edge is 9 ft. wide and 6 ft. high. Its length has been increased 64 ft. and its camber now aft and designed to accommodate the redesigned fin.

The new aft landing is slightly concave to create a full belly area that a major new landing-off nose-landing door. This is hinged at its forward end, its area can be lowered to the ground to afford a battery-duty ramp for loading units, nose-wheel and other equipment with a single wheel land of up to 3700 lb.

In the extended position, the door creates an unobstructed loading area 16 ft. wide by 7 ft. in height. The battery landing and unloading, the Raider's tail wheel is located in the loading door

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4. performs at operating pressures up to 150 PSI

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Blades are synchronized at all times. • Obstruction in path of blade will not stall it. Blades may wipe in same or opposed direction. • Blades are parked and locked when wiper is not in use. • Universal drive arm and tie rod require minimum stock of parts. • Wiper blades are easily replaced. • Pressure is removed from system when not in operation. • Moose unit may be located at any position in the airframe. Stroke on each window can be varied. • Hydraulic tubing eliminates leakage control and provides additional space for mounting other instruments. • Moose unit and window rain are universal, providing maximum interchangeability of parts. • Constant torque values through entire stroke. • Uniform stroke at all speeds. Simplicity of design, resulting in lower first cost and reduced maintenance expense.

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beige loss and is reducible by hydraulic power while the airplane is on the ground. The final wheel can be rotated forward and the airplane is in a level position. After loading is unloading is complete, the tail wheel lowers the aft fuselage to its normal flying angle for takeoff.

The fuselage is built in four major assemblies—main power plant section, flight deck, main fuselage, and tail cone. The interior can be fitted quickly to contain a wide variety of accommodations such as for carrying troops, letters, and cargo.

► **Landing Gear**—The Kailer tail group has been completely redesigned from that used on the Pioneer.

Lower portion of the fin is now an integral part of the aft fuselage and is hinged into its normal position.

The stabilizer has been moved to a pivot midway up the fin, and the rudder is divided into upper and lower segments to clear the elevator travel.

The tail section has been increased greatly in span, chord and area to accommodate the increased wing length, wing span and fuselage length at the new model.

All controls are cable-operated, the cables running the length of the fuselage along the ceiling.

The new design incorporates a completely new wing structure as contrasted to the original configuration.

► **Landing Gear**—Although this remains unchanged in layout, provisions have been incorporated for a variety of units. That wheel gear may be fitted to the main gear struts to permit the Kailer to operate from muddy or sandy fields.

This consists of an axle and wheel assembly added to the installed wheel, a change which may be made with ordinary wrenches and without jacking the airplane.

Wheel-les may be fitted to legs provided on the gear, and two flairs can be attached using the existing main struts.

Since the basic landing gear is of fixed design, there is no loss in performance with the use of the tie gear and only a slight improvement when flairs are attached.

► **Power Plants**—The craft is powered by three Wright Cyclone engines, mounted one in the nose and two in the wing center section leading edge. Provisions have been made for substitution of either the R-1525-75 engine at 1425 hp, or the R-1525-97 engine at 1700 hp takeoff rating.

All power units are interchangeable forward of the firewall, and each engine is readily accessible through large, hinged access doors in the necessary compartment and removable cowling segments in which the wing ribs and stiff sections are an integral unit.

Maintenance on the wing engines is



Kailer's fuselage in place. Midway indicates subdivision of disc, fin and rudder.

facilitated by hinged, windproof segments of the leading edge which fold forward and down to form convenient work stands.

Four-1500 gal-in. capacity in eight Manning fuel cells forward of the wing main spar. These are painted in pairs with one cell comprising a main tank with filler neck and the adjacent cell as auxiliary tank with interconnector bypass.

The fuel may be fed to the nose engine from any of the fuel cells.

Ability of the Kailer to operate safely on any combination of two engines is a vital safety factor for aircraft designed

for operation in rugged terrain and climatic conditions.

► **Operational Equipment**—Both versions of the Kailer carry standard communications and instrument sets together with radio compass equipment. In addition, the Arctic version will carry special radar navigational equipment.

Glide path and location moving equipment for ILS are connected to the electronic instrument pilot to permit automatic landing approaches under poor visibility.

Provisions have been incorporated for the installation of two 1000-lb. thrust

NORTHROP TULUMOTOR TRANSPORT

As Power C-115A Arctic Rescue
As Power C-121B Arctic Transport

Item	Model	Power
Span	37 ft. 0 in.	35 ft. 0 in.
Length	67 ft. 1 in.	68 ft. 0 in.
Height	21 ft. 9 in.	17 ft. 10 in.
Weight (empty)	19,600 lb.	14,400 lb.
Weight (gross)	22,100 lb.	17,100 lb.
Power Plants	Wright R-1525-35	Wright R-1190 (C121B)
Power (rated)	1425 hp	580 hp
Power (max. takeoff)	1775 hp	790 hp
Speed (cruise)	212 mph	200 mph
Speed (max)	250 mph	255 mph
Climax (cruise)	23,600 ft.	21,000 ft.
Climax (cruise, two engines)	16,000 ft.	11,000 ft.
Takoff (max. full load)	1775 ft.	1000 ft.
Landing Run	990 ft.	710 ft.
Wing Area	1151 sq. ft.	1190 sq. ft.
Wing Loading	21.7 lb./sq. ft.	22.7 lb./sq. ft.
Range (cruise)	2610 mi.	1770 mi.

Northrop Project Engineer, Fred J. Bann
Engineering Vice President, Max Stander

1470 seats for emergency bailout from confined areas with heavy load.

An auxiliary turbine is the precursor for attachment of a turbine to a fitting mounted on the fuselage, which permits the use of both outboard engines to assist the two plane during takeoff and climb. This towing position permits extremely long-range operations for the Raider.

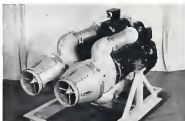
► **Service Features**—Throughout the redesign of the Raider, the simplicity of the prototype Pioneer has been preserved.

Accessibility for maintenance has been stressed throughout the design with doors and panels provided adjacent to installation servicing stations in operation.

Safety has been stressed through emergency provisions either through a door in the flight deck door or through a panel beside each pilot. And a large escape door is provided in the engine hold. All doors are jettisonable in emergency.

Vision has been improved by the addition of cockpit windows below the main windows, which permit vision at most vertically downward.

Throughout the structural design of the airplane, subcomponents have been made self-contained units with simple attachments, similar in possible, to facilitate field replacement.



Auxiliary-Power Turbine Readied

Solar Aircraft Co., San Diego, has produced a development model of a small, low-power gas turbine to provide auxiliary electric power in large planes.

Known as the Model 80, the unit is designed to operate at a nominal maximum power rating of 50 kw up to 40,000 ft with a 5 min sustained rating of 75 kw.

The engine has been developed primarily to supply 600 v a c of 180 amp. Overall weight of the power plant, complete with generating equipment, heater and accessories, is approximately 700 lb. Overall length is 52 in.

It incorporates several unique features, including an original reverse flow method of air handling.

Air is taken aboard through a peripheral air intake between compressor and turbine, and moves forward through the axial flow, multi-stage compressor to a centrifugal compressor which discharges it into two cylindrical combustion chambers on each of the dual cans.

After passing through the combustion chambers, where fuel and heat are added, the hot gases move through the turbine and forward through conventional nozzle assemblies, where it may be used for thrust augmentation if desired.

The dual cans are mounted in a single assembly with each main shaft geared to drive the generator.

The high electrical loads specified for modern jet craft, plus the necessity for keeping power extracted from the main turbines to a minimum, is making such a power increasingly important.

By utilizing a gas turbine-powered generator for this purpose, conventional jet fuel may be used and substantial amounts of thrust for the aircraft provided.

The Model 80 will not be ready for commercial availability until early next year. Solar has drawn on its extensive background as a producer of high test portable turbine engine assemblies and test-rig exhaust manifolds in the design and fabrication of this new auxiliary power plant.

Spring Transducer Wide Application

Many important applications in the field of sensors and other related activities are made by a highly sensitive mechanical-electrical transducer being developed at the National Bureau of Standards by W. A. Walbridge and associated personnel.

The device transforms slight displacements into large changes in resistance, current or voltage. Active element is a helical or conical spring in which that metal tension varies slightly along its length. Thus, when the spring ends are pulled apart, the turns separate one by one instead of simultaneously.

► **Resistance Varies**—When the spring is actually closed, it has an electrical resistance appreciably that of a cylindrical tube. When completely open, its resistance is equivalent to the total length of the coiled wire. Accordingly, resistance can be varied over a wide range by stretching the spring.

Since percentage change in resistance may be hundreds of times greater than percentage change in length, displacements as small as 1/100,000 in. can be measured easily without electrical amplifying equipment. The spring transducer thus provides a sensitive means



Experimental model of wire transducer. Weight produces longitudinal displacement of rod, changing one part of spring and decreasing other part in Wheatstone bridge. The resultant resistance of bridge gives measure of displacement.

for conversion of any mechanical displacement to a change in an electrical quantity that can be precisely determined.

► **Wide Application**—When connected to another transducer which gives a me-

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showed displacement output (for example, a thermionic stage depending on temperature changes), the development gives a readily measurable electrical output.

This type of unit suggests numerous applications—alarm pages, pressure electricity, accelerometers, constant weighing devices, automatic temperature controls, d.c.-a.c. meters, and voltage regulation.

Now It's Made—Preferable construction for the transducer is a five-year badge, with such are a veritable necessity spring. Inherent in applied reason comprises one pair of springs and short on the other pair. Resilient resistance of the bridge, as indicated by a gold displacement, gives a measure of the displacement. With this arrangement, since the voltage can be easily reversed through the bridge, output voltage can be electrically twice the value of the input voltage.

Variation of initial tension of the spring along its length may be varied by winding, varying the angle of load at the wire on a uniform spool, or by varying its tension as it is wound. For greatest sensitivity members in initial tension is made quite small.

To decrease contact resistance between adjacent turns of the closed coil, a high strength initial tension is built into the spring, and the turns are coated with (800) or gold. Corrosion, while alloy was not used because of its high sensitivity and small change of mechanical properties with temperature.

The new transducer is undergoing further development at the Bureau as part of a project on better performance for electronic research by the Office of Naval Research.

Roughness Comparator

To enable engineers and draftsmen to measure, select, and specify surface characteristics for production work, and machine operators and inspectors to determine by sight and feel whether surfaces meet designated specifications, pocket-size roughness comparator with mechanical finisher is announced by Special Products Division, General Electric Company, Schenectady 5, New York.

Two rules, 6 in. long and 14 wide, illustrate degrees of roughness ranging from smoothness of bearing surface to roughness of flame cut. One rule of each scale is divided into 12 parts, the total of 24 different surface groups into 16 degrees of roughness. Every degree is identified by a number which designates the measured roughness in microinches (average).

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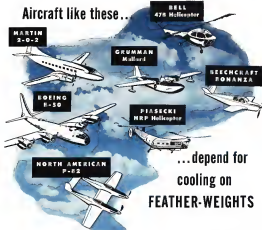
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Navy Using Largest Test Machine

New 5 million-lb.-capacity proving device made available to industry. Huge structures to be accommodated.

Navy has announced that the world's largest testing machine, the new 5,000-ton-capacity Baldwin unit at Philadelphia Navy Yard, will be made available to aviation manufacturers for structural tests requiring this tremendous load. Most powerful such machine ever built, the unit will also be used for tests on submersible, ship and gun assemblies.

The huge device cost \$140,000 and required an additional \$180,000 for erections and accessories, including the concrete foundation and an elevator to permit access to all sections. It took two years to build at the Baldwin Locomotive Works.

The 5,000-ton unit's maximum capacity of the machine, given by 1,000,000 lb. than any previous unit, will provide the aviation industry with badly needed maximum applied load tests.

The machine can create tension, compression or bending loads as required in increments as low as 4 lb.

Navy has already had one testing program to evaluate 75-80,000 psi 7072 aluminum alloy members, aircraft materials, complete wing panels, wing-cooling loading support, etc.

► **Machine's Features.** The installation stands 47 ft above the 1st floor and extends 36 ft below.

A catwalk elevator with 5000-lb. capacity surrounds the structure and aids in preparing test set-ups and observing results. Test personnel will be protected by a safety system made of steel plate and bullet-resistant safety glass.

A traverse bearing test platform, 50 ft long with 7-ft-deep guides in marked level with the 1st floor for testing beams horizontally under traverse bending loads.

Total weight of the machine and the bearing platform will be approximately 1,600,000 lb.

Test facilities will be for specimens up to 10 ft long in tension or compression and up to 50 ft in bending. Clear space between the series is 10 ft, length of load plate is 12 ft.

Loading will be via hydraulic. Four large springs on the loading head will eliminate the weight of any part of the machine from the indicated load on the specimen.

The weighing system, entirely separate from the loading function, is accurate to at least 1 lb. at one percent. These are six loading stages: 5,000,000, 2,500,000, 1,000,000, 500,000, 125,000 and 25,000 lb.

► **New It Operates.** The machine can

test, usually, of three distinct groups, for loading, weighing, control.

In the loading system, the pump delivers pressure to the hydraulic cylinder, which is forced down, pulling with it the large series and the sensitive crosshead.

Since the traction embodied in the top and the bottom is the same stationary, the downward movement of the sensitive crosshead applies either a compression or a tension load.

The weighing system, also hydraulic, is supplemented by an air system for extra sensitivity.

Control system includes both mechanical and electrical units connected with the loading and weighing systems.

Most important unit of the weighing system is the Easys roll, which measures load pressure to the indicator. It is a shallow cylinder having a loose fitting piston and a metal diaphragm so arranged that the load on the specimen produces change in a thin film of liquid trapped between the piston and the cylinder bottom. Relative movement of piston and cylinder is precisely measurable.

► **New It's Regulated.** Controls are all housed in a single cabinet. Three large hand wheels allow for application of the hydraulic load at any load speed between 0 and 5 in./min. for maximum rate release of the load on a specimen, and raising and lowering the loading head (for positioning purposes prior to testing) at 0 to 20 in./min. speeds.

Starter buttons show the hand wheels control the power for the various electric systems, control rate or lower the elevator, actuate the hydraulic pump, and turn the screw for positioning the loading head.

Several knobs on the upper part of the cabinet permit control of load rate, automatic maintaining of any predetermined constant load, and selection of any one of the six load ranges.

Large dials on the cabinet indicate the load constant in specimen. Smaller dials show readings of any pressure in the line to the servohydraulic system which is part of the weighing system, or pressure for the load maintenance system, or pressure in the back-up hydraulic circuit on the large series, and pressure of the loading head at its 16 in. stroke.

In addition to its press test functions, the machine will give results on full size structures for correlation with tensile tests on scale models.

This will make model testing a more accurate basis for design. Representative weight in size of structure usually does not produce proportionate changes in strength properties. But what the relationship may be, will be determined by comparison of test results and computer data.

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NEW AVIATION PRODUCTS



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Cowling fastener specifically designed to meet demands of high speed service is marketed by Eber-Frazier Co., Inc., Balaire, N. Y. Designated "Super-union," each consists of fully enclosed spring interplate engaged by stud embodying special cam profile, so that opening or closing is obtained by rotating stud 1 turn. Device is available in all sizes, styles, and movements of lengths specified in Specification AN P-45, and standard size built in fluting and stationary form.

drone, gress, amplifier, accelerometer, etc. Frequency response can be plotted quickly and transient characteristics obtained. Carrier (30 to 800 cps) mode level test signal (1 to 10 cps) is supplied. With scope's dual, rapid measurements may be made of frequency logarithmic attenuation and phase shift. Constant networks and adjustments on the servomechanism may be introduced without resorting to costly experimental revisions in system. Tubular mechanical design and/or in largely eliminated, and transfer functions are easily derived. Visual display of signal amplitude and phase on a strip screen gives quick comparative values. Device provides amplitude range from 0 to 20 v. rms, phase lead or lag accuracy to within 2 deg. (phase shift is calculated from 0 to 360 deg. in 1 deg. divisions). Power consumption is held to 40w.



Tests Pressurized cabins

Developed by Gene Hydraulics, Inc., Balaire, N. Y., Model CLP-1 pressurized cabin test machine is designed for checking air high altitude suits such as Boeing Stearman, Douglas DC-6 and Lockheed Constellation. Compact design is mounted on rubber-tired wheels for portability with use for low or high. Unit is powered by electric motor and incorporates an air source capable of delivering up to 400 cfm of free air at 15 psi to the cabin. Flow rates and readings are provided. Pressure and temperature of air in place are accurately controlled by relief valves. Flowmeter and pressure and temperature gages are provided to indicate exact cabin condition. Aircraft type and all present design matter and necessary measurements are used to indicate rate of cabin pressurization.



Emergency Light

Portable, emergency airport light offered by U-C Light Mfg. Co., 1050 W. Highland St., Chicago 22, Ill., has waterproof, baked enamel steel container for two standard dry-cell lantern batteries and connections. Double-flush, single pole switch gives instant selection of either steady beam or flash with 100-112 flashes per min., and light is visible in all directions for over 600 ft. Ordinary burning life of batteries is said to give continuous flashing for 25 hr. or steady light for 30 hr. Two independent bulbs are used, so that if one burns out, other continues to operate. Third bulb in emergency socket serves as spare. Lens of molded plastic directs light in horizontal beam.



Precision Shear

For rapidly shearing wide variety of materials to extremely close tolerances, O'Neil-Town Mfg. Co., Laitz City, Missouri, offers tool with cutting range extending from light plastics, Elmer's, tape, rubber and rubber in heavy gages of aluminum and steel. Shear is adaptable to model, standard and re-pressurized work and delivers power and fast operation with a great variety of small precision work. Maximum shearing width is 1/2 in., maximum material capacity is 16 gage sheet steel (1/32).



For Control Engineers

Precision electronic instrument, Servoscope, developed by Servo Corp., 3030 Jericho Turnpike, New Hyde Park, N. Y., is designed to furnish continuous performance data about mechanisms or process control and may be used to check complete error loop or components, such as sensors, etc.

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4 SHOCK ABSORBER SUSPENSION. The universal Navion takes heavy duty compressors in stride. Steady control action and shock absorber wings, no wing and tail control safety and low maintenance cost. For permanent beauty, double wheel tires new standard—choice of 4 striking colors.



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Illustrated above is one of Northwest Airlines' skilled mechanics accurately tensioning thrust plate nuts with a Snap-on Torquemeter No. TQ 150.

AVIATION SALES & SERVICE



Top personal aircraft engineers and technical experts attended the recent discussion of spin requirements for personal plane held under leadership of Fred E. Weick, director of Trans A & M College's Personal Aircraft Research Center, at the center. Left to right above seated, H. A.

Sutton, Ryan Aircraft's Don J. M. Gumbel, assistant CAB safety bureau director, Max E. B. Harnett, secretary, Prof. Weick, J. E. Roush, CAA, M. J. Goff, Joseph Aircraft Corp., D. C. McCarty, Trans Engineering & Manufacturing Co., standing, H. G. Edmonds, Lutzville Air-

plane Corp.; J. H. Gurnea, Coates Aircraft Co.; E. E. Smith, Trans A & M mechanical engineering department; H. F. Kuch, Aerocon Aircraft Corp.; C. W. Von Rosenberg, CAA; Robert Sanders, Sanders Aviation (Flint) and A. J. Nilsen, NACA.

Spin Tests May Be on Way Out

CAB and CAA expected to act soon to eliminate long-delayed requirement from Civil Air Regulations.

Proposal to eliminate spin tests from Civil Air Regulations certification or requirements for private pilots has been gathering momentum in industry and government quarters for the past several months and is likely to be approved by CAB and CAA in the near future.

John M. Gumbel, CAB safety engineering director, last month began circulation of a draft of a proposed regulation eliminating the spin requirements. The draft was analyzed last week at Indianapolis at a meeting of the Non-scheduled Flying Advisory Committee for CAA.

Specifically the proposal would eliminate subsection 23.1614(a) "A person spin in stalls during starting the recovery with an angle of not more than plus or minus 19 degrees" and would insert subsection (f) to include "(f) he has been given instruction as recovery from poweroff and power-on stalls entered from straight flight and turns."

What Unfettered the proposal is a

growing feeling among progressive aviation groups that the spin tests as now conducted are not worth the time and money to fly, and tend to make every pilot who doesn't like to spin. They also put a penalty on any airplane that is spin proof or spin resistant, since every pilot who wants to fly must take at least part of his training in an airplane that will spin, unless he gets a limited spinproof plane license.

Representative in the total picture is the recent conference held under leadership of Fred E. Weick, director of the spinproof experimental program, at the new Personal Aircraft Research Center which he heads at Trans A & M College, College Station, Texas.

Majority of a group of personal plane company engineers represented personally or by letter expressing their views recommended a change in the present CAB spin requirement. They also argued that the new rules give top priority to work on airplane control at the stall. Other projects recommended as im-

portant are fan-control spin recovery, design of spinproof planes, development of a straight flight arrangement of design requirements for spinproof airplanes and means to achieve major increases in spin margins. The center has already obtained an NACA contract to investigate high lift devices for personal aircraft.

Paul Weick pointed out that there is little doubt on free control recovery available in the personal aircraft field. Most NACA spin research previously has been in the military field, and the military planes are permitted to recover from spins with full opposite controls. The statement was verified by A. J. Nilsen of NACA, one of the observers at the conference.

Others—Others attending the meeting included M. J. Gumbel, H. F. Kuch, G. E. Smith, H. A. Sutton, Don J. M. Goff, J. E. Roush, CAA, Robert Sanders, Sanders Aviation (Flint), C. W. Von Rosenberg, CAA, Charles E. Goff, CAA, and E. E. Smith, Trans A & M mechanical engineering department.

Effect of the removal of the requirement might be felt favorably by the Ross Nevada and the Sierra Voyager, two of the most experimental designs now being marketed, and would prob-

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AIR TRANSPORT



W. A. Patterson

Joseph O'Connell, Jr.

Who's to Blame in Airline Crisis?

UAL's Patterson accuses Civil Aeronautics Board; Chair-
man O'Connell replies in Board's defense.

By Charles Malone

The continuing financial crisis faced
by a huge part of the air transport in-
dustry has brought the chairman of the
Civil Aeronautics Board and top airline
executives to verbal sword's points over
who is to blame.

Most recent public criticism of the
Board has come from W. A. Patterson,
president of United Air Lines, who to-
gether with Northwest Airlines' Presi-
dent, Goddard, last summer as-
sembled CAB's leaders to carry out its
duties pursuant to the Civil Aeronautics
Act (Aviation Week, Aug. 9).
Patterson told the four Board mem-
bers that CAB "is principally responsi-
ble for airline difficulties today."

► **Faces Investigation**—The current
problem, Patterson declared, is not what
is wrong with the airlines but what is
wrong with the Civil Aeronautics Board.
"It would like to sit on its hands or throw
out the window transportation economics
of the United States appointed to as-
surge the stewardship of CAB over
the airline. I am confident that an ob-
jective appraisal would show substantial
failure—failure to understand and con-
tinue the basic problems of air transpor-
tation, and failure to carry out the
Board's stated responsibility to foster
sound economic conditions within the
industry."

Patterson said that is contrast to the
Interstate Commerce Commission,

which regulates the railroads and has
recently provided financial relief in the
form of higher rates, CAB has ap-
peared to be confused and conflicting.
The UAL president added that the
Board's failure to provide adequate relief
pay is associated with its negligence
under the Civil Aeronautics Act had led
the public with the impression that ap-
peals are inefficient and unresponsive.
► **Losses Cited**—During the past 18
months the domestic air transport in-
dustry has lost \$25,000,000, Patterson
stated. Yet the Civil Aeronautics Act
requires CAB to foster sound economic
conditions. "These losses, he said, is
inadequate effort against the Board.
Patterson also accused CAB of creating
excessive competition.

A day later, Chairman Joseph J.
O'Connell, Jr., in a speech before the
aviation law clinic at the Chicago Bar
Association, defended CAB and in-
dicated the entire way not blameless but
their performance. He denied industry
allegations that the Board has been
"grinding the faces of the poor."

► **O'Connell Seen Good Progress**—In
a new, O'Connell said, that CAB has
been behind schedule in setting per-
mission and rates—partly because of
inadequate staff. But, he continued, we
are making good progress, "and I re-
main to take seriously the charges brought
by some critics that the permanent rates
we have set are unfair or inadequate.
We have no situation of depressing

government funds with an open hand
and an overvalued eye."

O'Connell admitted that the airline
financial situation is serious but not irre-
versible. He quoted statistics that the 19
carrier losses, all but around \$10,
\$80,000,000 this year after a \$10,000,000
deficit in 1947 (Aviation Week, Dec.
7).

► **No Passions in Mind**—The chair-
man emphasized, however, that the air-
line's financial problems are not a variety
of crises. "No single person will
solve them—not even individual rail-
road."

O'Connell denied completely that
CAB had blundered badly by author-
izing excessive competition during re-
cent years. "On an overall basis, he
declared, "I do not believe the Board
can be reasonably criticized for its basic
approach to the expansion of the air
route network in the postwar period."

In view of the unlimited optimism
of the critics the chairman said the prob-
lem, he is not surprised that CAB
in the postwar period found full
publication in the record of new route
costs for the regulation of additional
competition and service, the chairman
added. "On balance, and remembering
the the atmosphere of postwar days,
it seems to me that in general the Board
has handled its route issue with reasonable
able action."

► **Over-Optimism Resulted**—Blaming
the postwar optimism of the air trans-
port industry, which became almost ex-
tended traffic expansion, O'Connell
said one error led to another that
if one of them should have been
correct, some would have been
large planes that had better ways to
solve they did not have the same ex-
cesses for the future business. The com-
pany, he said, has only a small fraction
of 1940 aircraft.

"To be sure the Board did emphasize
competition or additional competition
over route expansion which before
we had been told by the airlines that
the airlines declared "Many
of these route awards were made to
airmen which now comprise most traffic
costs about revenue competition."

"I believe that a possibly important
factor in the Board would have been a
strong move during the postwar period.
It would certainly have called down to
the Board the weight and incentive
of the current, concentrated during an
airline strike and, very probably, the
Compass."

► **On Monopoly Issue**—"We frequently
have ourselves in a false situation as
the Board has made two much con-
sideration, but I will be happy to share
the speaker and articles in the effort
that CAB has been, and now is, an
important champion of monopoly and
without of its ability into the airline
business. On contrary, even between the

American Reports '48 Loss Reduction

Third-quarter earnings of \$1,869,686 have reduced American Airlines net loss for the first nine months of 1948 to \$1,995,993. Last year, the carrier reported a \$1,272,514 net loss for the same quarter, and federal tax carry-back refunds aggregating \$889,434 increased the nine months' loss to \$1,014,779.

Final quarter of 1948 should be better positive than the same period last year, when American had a domestic operating loss of around \$3,800,000—partly because of the ICA's expanding role of ICA's and Civil Aeronautics in the sale of less efficient equipment (which being American's best-known passenger load factor down to 55.4 percent in September).

As contrasts to report good results from its first-of-the-month, family firm plan. Latest estimates are that the plan accounts for about 10 percent of American's passenger business.

► **Confidential**—Net income through September totaled \$176,899 against an adjusted profit of \$77,138 in the same 1947 period. Although revenue passenger mileage dropped slightly from 45,447,773 in the last quarter of 1947 to 46,955,259 this year, passenger revenue gained about 7 percent with the help of fare hikes. Freight ton miles increased 134 percent over the first nine months of 1947, except volume was up 17 percent and mail volume 6 percent.

► **Mail Carriers**—Net loss for the first nine months of 1948 was \$470,000, compared to a \$470,000 profit in the same 1947 period. Operating revenues were up 28 percent over the first three quarters of last year, but expenses rose 28 percent. Revenue passenger mileage increased nearly 15 percent and ton miles 115 percent compared to 1947.

Northwest Sets Date For Hawaii Service

Northwest Airlines has announced plans to inaugurate its new route between the Pacific Northwest and Hawaii on Dec. 1 and has told the Civil Aeronautics Board it will need \$1,272,564 in mail pay during the first year of the airline's operation to break even.

Three DC-4 roundtrips weekly from Seattle/Tacoma, Wash., and Portland, Ore., to Honolulu will be flown at the outset. Boeing Superfortresses may be put on the line next year.

► **Block-Fare Rate**—The \$1,372,664 which NWA claims it will need to break even during the first year is equal to about \$1.57 a plane mile. The carrier

has suggested that its temporary mail payment be \$1.65 a plane mile. Non-mail income during the first twelve months is estimated at \$482,376, while total operating expenses will be about \$1,774,988. Average passenger load for the first year was placed at ten and the average passenger load factor at 41.60 percent.

Meanwhile, President Truman's secret order in directing CAA to certify that Pan American Airways for a special Pacific Northwest-Hawaii route (Alaska via West Coast) has been changed of "golden" NWA, was criticized for its lack of faith, and both authorities are now made despite a CAA contract report that there was insufficient traffic potential to support extra one-way without high subsidies.

Television for Viking

Following the lead of Capitol Airlines (CAA), Viking Airlines, Inc., announced a scheduled-upon-air service on its eight DC-4s. Sets to be used in Viking planes, which display over 50 D and will provide a 15-inch wide-view screen mounted in the front of the passenger cabin. A rotating display screen will be mounted between the wheels on the belly of the aircraft.

Australian Air Traffic Up

About one in ten Australians used commercial air transportation in the year ended June 30, when the nation's airlines carried 1,217,173 passengers, a 39 percent increase over the previous year. Freight volume rose 118 percent because of restriction on motor goods imports, further passenger and freight traffic have to come out of aircraft load margins.



PIN FOR C. R.

C. R. Smith, 4th, American Airlines board chairman, received his 20-year airline pin from AA President A. C. Deane last month. Smith's airline career began in 1928 when he became treasurer of Texas Air Transport, a predecessor company of American Airlines. He joined American's staff in 1934 and held various positions.

Airlines Appoint New Officials

Appointment of Stanley G. King as central regional vice president of American Airlines and of Harry R. Fleming, Jr., as operations manager of Pan American Airways' Atlantic division, has been announced by the two carriers.

King replaces Lewis W. King, central vice president since 1944, who resigned to organize his own business. Stanley King has been president



H. R. Fleming, Jr. Stanley G. King

of American Airlines of Mexico since August 1947. For five years prior to that he held the posts of general traffic manager and vice president and managing director of American Airlines of Mexico.

Fleming has been in Brownsville, Tex., for the past three years as senior chief pilot for PAA's Latin American Division. His new duties being his work in California Field, where in 1941 he won his Master Pilot rating flying Boeing 314s.

Argentine Airline Orders Sundringhams

(McGraw-Hill World News)

LONDON.—The Argentine airline company, A.L.T.A., which already has three Short Sunderland flying boats in service on the route from Buenos Aires to Antarctica, has just ordered an additional two of the same type, each costing \$1.5 million.

The new planes will come out of the few remaining ones of that type still under production at Short Bros. & Harland, Belfast. They are being ordered, in point of fact, from the military reserves, the Sunderlands, which were developed toward the end of the war as an anti-submarine patrol plane for the RAF's Coastal Command.

The Sunderlands 7, the latest version of the type, has four Pratt & Whitney Twin Wasp R-1350-98 radial piston engines, developing 4000 hp., a gross payload of 6213 lb. and a range of 1768 mi. on 1573 gal of fuel at a cruising speed of 176 mph. Short Bros. has now developed an improved flying boat trans-

port, the Solent (adopted, notably, from the RAF Solent), which has four Hercules 755 engines developing 5800 hp. and a gross payload of 12,150 lb. The Solent has a range of 2140 miles on 2623 gal of fuel at a cruising speed of 200 mph. BDCG is using Solent on its London-South Africa service.

The two additional Argentine Sunderlands are expected to be delivered by the end of 1948.

Post Office Asks for High in New Feeder Certificates

The deficit under the Post Office Department has again called on the Civil Aeronautics Board to adopt an ultra-conservative approach toward the feeder experiment.

Approximately \$112,000,000 in the net charge fiscal 1948 and expiring a \$150,000,000 deficit in fiscal 1949, the Post Office wants CAA to declare "as a matter of policy" that no new local feeder certificates will be issued "pending final evaluation by the Board of the results of the 18 presently authorized feeder experiments." The Department made its request in a brief opposing a CAA revenue's recommendation that Southwest Airways' present routes be awarded and that Hawaiian Air Lines be given a new operation in the Cook Islands (Aviation Week, Sept. 27).

► **Mail Fee Roster**—Six leaders which operated during all of fiscal 1948 to total a total of \$5,109,113 in adjusted mail pay, and this amount is subject to further revised revision by CAA, the brief said. "Presenting the ten firms to cover 19 airlines in operation, it appears that the present amount is inadequate to a local revenue experiment on a national scale which may cost at least \$16,000,000 in mail pay per year." The newspaper, the 16 domestic mail carriers, received about \$21,150,000 in mail pay in calendar 1947.

In view of the number of feeder certificates presently authorized by CAA, what new knowledge will be obtained from certification of Bonanza over a 550 mile route, the Post Office argued. "And as the knowledge acquired will be gained with the expenditure of \$1000 a day the government would be asked again to pay in mail transport."

► **Board Opinion Quoted**—The brief quoted extensively from CAA opinions which emphasized the strictly experimental nature of feeder operations. As early as Feb. 1944, the Board noted: "The necessity of learning both new aircraft and the methods of local service within reasonable bounds."

Of the 19 airlines selected by CAA, temporary certificates have actually

been issued to 17. Eleven are now in active operation.

► **Helicopter Services**—In opposing certification of Southwest Airways for new routes near Los Angeles, the Post Office referred to its previous report that CAA receive an air unit including beyond 50 miles from the downtown metropolitan area for potential service development by Los Angeles Airways, the nation's only active certified helicopter carrier line. The Department and its stand is based on the concept that LAA may ultimately be certificated to carry passengers and that this will lessen the government's and private burden.

Growing acceptance of the helicopter service is demonstrated by the fact that in August, 1948, LAA earned \$391,174 profit of profit. By comparison, the Post Office pointed out that All American Airways' pickup service never averaged an average of 3,000-6,000 passengers monthly.

New Canada-BWI Link

Canada will strengthen its economic and social ties with the British West Indies on Dec. 2 when Trans-Canada Air Lines is slated to inaugurate service from Montreal and Vancouver to Nassau, Jamaica and Trinidad. Three weekly flights will be made to Nassau and Kingston, Jamaica, and weekly trips to Port of Spain, Trinidad.



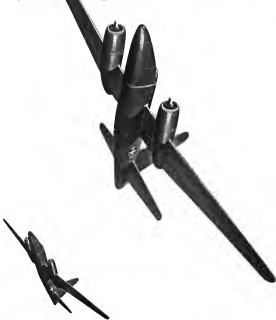
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CAB Revokes Pilot's License

Charles R. Soto, captain of the Ansett was a Lockheed DC-4 which crashed half of an aerial loop near Mt. Riley, New Mexico, on Oct. 1, 1947, has had his pilot's certificate revoked for operating the plane in a careless and reckless manner.

Upholding the initial decision of its safety examiner (Aviation Week, Mar. 3), the Civil Aeronautics Board today said Soto had neglected the post lock maintenance, thereby causing the violent maneuver which endangered the lives of 49 passengers and five crew members. The plane dove several thousand feet in within 400-500 ft. of the ground before being brought under control by the cockpit.

► **Probably Required**—CAB said the pilot's interest requires that Soto should never again be issued a pilot's certificate or rating which would permit him to carry passengers for hire. It added that Soto had demonstrated a disregard for the principles of safety and a flagrant disregard of the decisions and good judgment necessary in the holder of a pilot's certificate with airline transport pilot's rating.

"That one trained by years of experience at the controls of aircraft carrying passengers in public service should have been so remiss in his duty toward those whose safety had been entrusted to him is a shocking violation of human values which unfortunately is not among the attributes of this country," the board declared.

► **Purpose of Lock**—The post lock was not designed to be used under any circumstances while the plane was in flight, according to CAB. The lock is applied from a lever in the pilot's compartment which mechanically pulls the control surfaces and locks them in place in a neutral position. Its purpose is to hold the control surfaces fixed while the plane is on the ground to prevent the surfaces from shaking back and forth and to prevent damage to the surfaces by the elements.

Northeast-Wiggins Agreement Ended

Termination of the agreement whereby passengers of Northeast Airlines' routes were to have been taken over and operated by Wiggins Airways has been announced by Joseph Gaudin, Wiggins Airways president.

► **Contingency**—The agreement, signed by the two companies last May, was contingent on approval by the Civil Aeronautics Board. It was contemplated that the transfer of routes would create two

separate transportation systems in New England, one of local and feeder character to be operated by Wiggins, and the other of long haul or trunk character, to be operated by Northeast. Wiggins currently operates about 607 miles of feeder routes in June, 1946, but has not yet activated its system.

Gaudin explained that developments in the aviation industry and in government planning, combined with the fact that CAB has not taken final action on the proposed plan, make the agreement unsuitable. "The agreement was a short-term affair, drawn with the anticipation of speedy action and completion before now. But in view of the pace established by CAB, it appears that 15 months to two years is not far before final action could be expected."

Landing Instructions Jammed by Russians

A Russian radio station in the nearby Komondorski Islands has been interfering with radio communications in the Alaskan Islands, according to R. C. Moore, owner of Ketchikan Airways, Anchorage, Alaska. The Russian transmitter reportedly has jammed radio conversations which pilots were holding with ground bases on routine commercial flights and has placed obstructions to pilots making GCA landings.

The jamming is done both continuously and by voice, says Moore, who operates two-way radio-telephone plant on the islands. He says the jamming is in the worst of Alaska (Anchorage, Alaska, Apr. 20). Special steps have been taken to enable pilots to recognize attempted jamming and to provide them with adequate means of clearing their position despite jamming attempts.

TWA to Buy Canics

TWA has asked Civil Aeronautics Board permission to buy two model C49 Constellation from Hughes Tool Co. for use in domestic operations.

Hughes Tool, which has financial control of TWA, will sell the planes to the carrier at cost—which will be not more than \$1,091,000 for both. One plane has been consumed and the other is in the process of conversion from military to commercial type. The ships will be used by TWA on a no-charge basis pending action by CAB.

TWA and its recently purchased trustee model 749 Constellation at about \$913,000 each. It also noted that the price to be paid Hughes Tool for the model 49's is substantially below the \$715,000 per plane paid Lockheed Aircraft Corp. for the same models in May, 1947.

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Skyhook

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